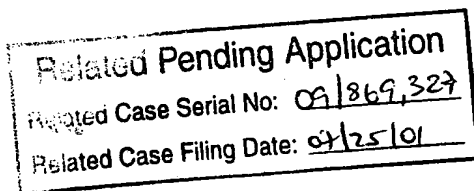
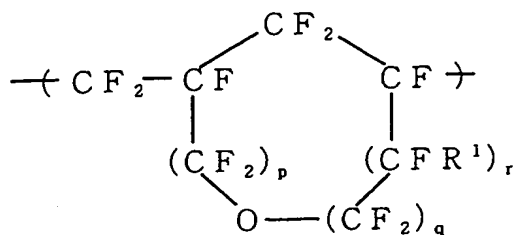


CLAIMS

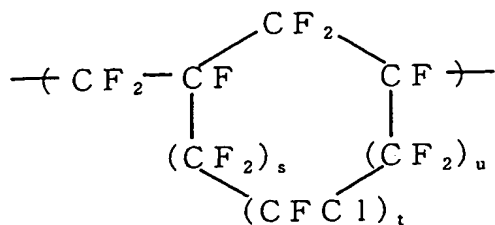
1. A polymer electrolyte fuel cell comprising a polymer electrolyte made of an ion exchange membrane, catalyst layers disposed on both sides thereof, and current
5 collectors disposed on the outer sides of the catalyst layers, wherein the current collectors are made of a porous sheet having a solvent-soluble fluorine-containing polymer having substantially no ion exchange groups, deposited on its surface.
- 10 2. The polymer electrolyte fuel cell according to Claim 1, wherein the solvent-soluble fluorine-containing polymer is a polymer having a fluorine-containing aliphatic ring structure.
3. The polymer electrolyte fuel cell according to Claim
15 2, wherein the fluorine-containing polymer contains polymer units of the following formula 1, 2, 3 or 4; provided that in the formula 1, R^1 is a fluorine atom or a trifluoromethyl group, p is an integer of from 0 to 5, q is an integer of from 0 to 4, r is 0 or 1, and $p+q+r$ is
20 from 1 to 6, in the formula 2, each of s , t and u which are independent of one another, is an integer of from 0 to 5, and $s+t+u$ is from 1 to 6, in the formula 3, each of R^2 and R^3 which are independent of each other, is a fluorine atom or a trifluoromethyl group, and in the
25 formula 4, v is 1 or 2:





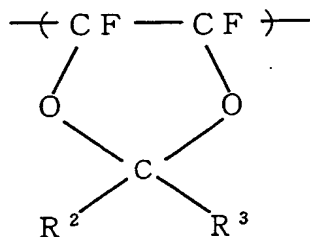
... Formula 1

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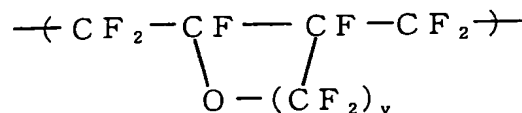
... Formula 2

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... Formula 3

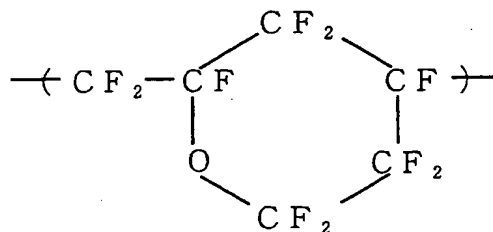
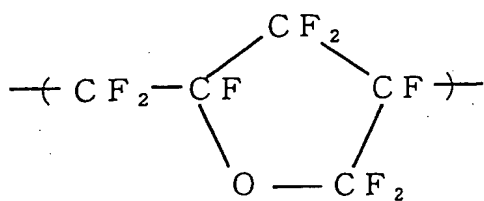
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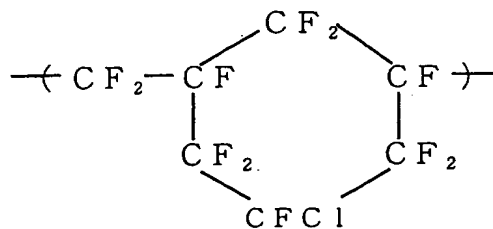
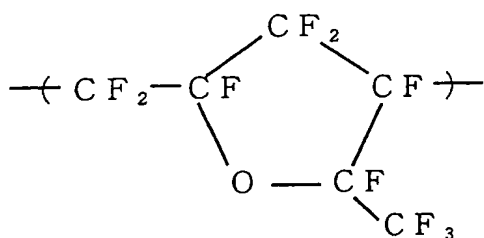
... Formula 4

4. The polymer electrolyte fuel cell according to Claim 2, wherein the fluorine-containing polymer contains polymer units represented by any one of the following formulae 5 to 13:

5



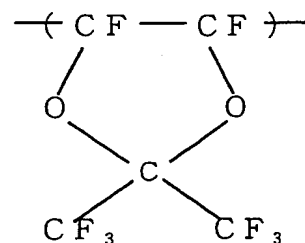
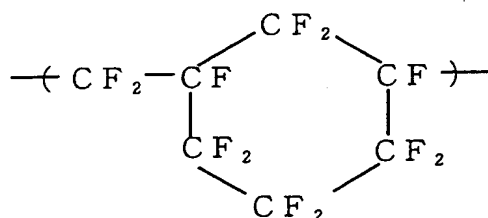
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... Formula 7

... Formula 8

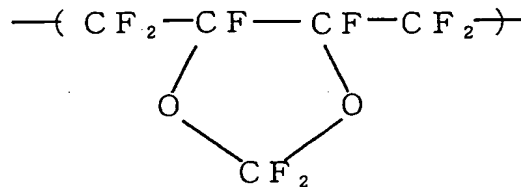
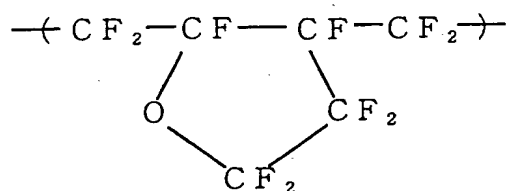
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... Formula 9

... Formula 10

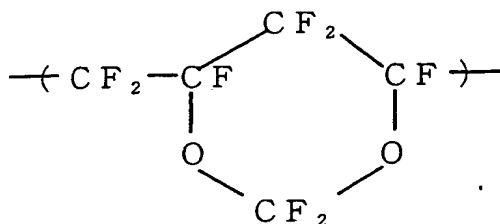
20



... Formula 11

... Formula 12

25



... Formula 13

5. The polymer electrolyte fuel cell according to Claim 1, 2, 3 or 4, wherein the fluorine-containing polymer is contained in the current collectors in an amount of from 0.001 to 60% based on the total mass of the current collectors.
6. The polymer electrolyte fuel cell according to Claim 1, 2, 3, 4 or 5, wherein the porous sheet is made of a carbonaceous material.
7. The polymer electrolyte fuel cell according to Claim 1, 2, 3, 4, 5 or 6, wherein the porous sheet has a thickness of from 0.1 to 1 mm and a porosity of from 30 to 90%.
8. A method for producing a polymer electrolyte fuel cell, which comprises disposing catalyst layers on both sides of a polymer electrolyte made of an ion exchange membrane, and further disposing current collectors made of a porous sheet on the outer sides of the catalyst layers, wherein the current collectors are obtained by impregnating or spraying a solution having a solvent-soluble fluorine-containing polymer having substantially no ion exchange groups, dissolved in a solvent, to the porous sheet, to deposit the fluorine-containing polymer on the porous sheet.
9. The method for producing a polymer electrolyte fuel cell according to Claim 8, wherein after depositing the fluorine-containing polymer on the porous sheet, the

porous sheet is heated at a temperature of from 100 to 250°C.

10. The method for producing a polymer electrolyte fuel cell according to Claim 8 or 9, wherein the solvent is a
5 fluorine-containing solvent, and the concentration of the solute in the solution is from 0.01 to 50% based on the total mass of the solution.

ABSTRACT

A polymer electrolyte fuel cell comprising a polymer electrolyte made of an ion exchange membrane, catalyst layers disposed on both sides thereof and current
5 collectors disposed on the outer sides thereof, wherein a solvent-soluble fluorine-containing polymer (preferably a polymer having a fluorine-containing aliphatic ring structure) having substantially no ion exchange groups, is incorporated in the current collectors.

10 By the above construction, the current collectors can have a high water repellency for a long period of time, and the polymer electrolyte fuel cell can operate at a high output density constantly over a long period of time.